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Complications and outcomes of the transfibular approach for posterolateral fractures of the tibial plateau

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ABSTRACT

Objective: Evaluate complication rates and functional outcomes of fibular neck osteotomy for posterolateral tibial plateau fractures.
Design: Retrospective case series.
Setting: University hospital.
Patients: From January 2013 to October 2014, 11 patients underwent transfibular approach for posterolateral fractures of the tibial plateau and were enrolled in the study. All patients who underwent transfibular approach were invited the return to the hospital for another clinical and imaging evaluation.
Intervention: Transfibular approach (fibular neck osteotomy) with open reduction and internal fixation for posterolateral fractures of the tibial plateau.
Main outcome measurements: Complications exclusively related to the transfibular approach: peroneal nerve palsy; knee instability; loss of reduction; nonunion and malunion of fibular osteotomy; and functional outcomes related to knee function.
Results: Two patients failed to follow-up and were excluded from the study. Of the 9 patients included in the study, no patients demonstrated evidence of a peroneal nerve palsy. One patient presented loss of fracture reduction and fixation of the fibular neck osteotomy, requiring revision screw fixation. There were no malunions of the fibular osteotomy. None of the patients demonstrated clinically detectable posterolateral instability of the knee following surgery. American Knee Society Score was good in 7 patients (77.8%), fair in 1 (11.1%), and poor in 1 (11.1%). American Knee Society Score/Function showed 80 points average (60–100, S.D:11).
Conclusion: The transfibular approach for posterolateral fractures is safe and useful for visualizing posterolateral articular injury. The surgeon must gently protect the peroneal nerve during the entire procedure and fix the osteotomy with long screws to prevent loss of reduction.
Level of evidence: Therapeutic level IV.

Introduction

Posterior fractures of the tibial plateau are increasingly common, and the orthopaedic surgeon is becoming familiar with this demanding treatment. The injury mechanism is an axial force with the knee in flexion. The knee position (varus, valgus, or neutral) determines the fracture location in the posterior column of the tibial plateau (medial, lateral, or both, respectively) [1].

Treatment for posterior column fractures has changed significantly during the last decade. Since the first posterior approach descriptions by Galla [2], Lobenhoffer and Tscherne [3], and more recently with the application of the three column concept [4], surgeons have become more confident performing exposures and treatment of posterior fracture variants.

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Many surgeons are cautious about using the transfibular approach due to the concerns about iatrogenic injury to the peroneal nerve and complications related to the fibular neck osteotomy.

However, in some fracture patterns with posterolateral articular displacement, the transfibular approach can be the best option to achieve joint surface visualization and accurate fracture reduction, thereby diminishing posttraumatic arthritis risk.

The present study aims to evaluate complication rates related to the transfibular approach for posterolateral fractures of the tibial plateau. We evaluated peroneal nerve palsy, knee instability, nonunion, and malunion of the fibular osteotomy site.

Ethical approval was granted by the local ethics committee.

Patients and methods

From January 2013 to October 2014, 11 patients underwent transfibular approach for posterolateral fractures. All surgeries were performed in one university hospital by experienced fracture surgeons. Two patients did not return for regular follow-up and were excluded from the study.

All fractures were classified using both Schatzker and the three-column classification systems [5].

Age average, gender, injury mechanism, Schatzker and Luo classifications are shown in Table 1.

All patients treated with transfibular approach were followed in outpatient clinic with regular clinical and x-ray evaluation.

American Knee Society Score and American Knee Society Score/Function were used to verify treatment outcomes.

Follow-up average was 16 months (12–21 months, SD:3).

All patients had standard anteroposterior and lateral radiographs.

Fracture and osteotomy union were defined as bridged cortices on two radiographic planes and full weight bearing without pain.

Statistical analysis was conducted using SPSS with a confidence interval at 95%.

Surgical technique

Depending on concomitant anteromedial, anterolateral, or posteromedial fractures, the patient was placed either in a prone or a lateral decubitus position. Either a general or spinal anesthesia was utilized, and prophylactic antiobiotics were administered. A tourniquet was used routinely. A ten centimeter posterolateral approach was performed using the fibular head as a landmark. The incision starts approximately 3 cm proximal to the fibular head and extended approximately 5–7 cm distally. The peroneal nerve was carefully identified and gently protected with a number 2 Penrose drain during the entire procedure.

After identifying and protecting the nerve, the fibular head was drilled with a 2.5 mm intramedullary drill, starting at the proximal tip of the fibular head and directed distally into the intramedullary canal, facilitating later screw fixation of the osteotomy. A 1.5 mm

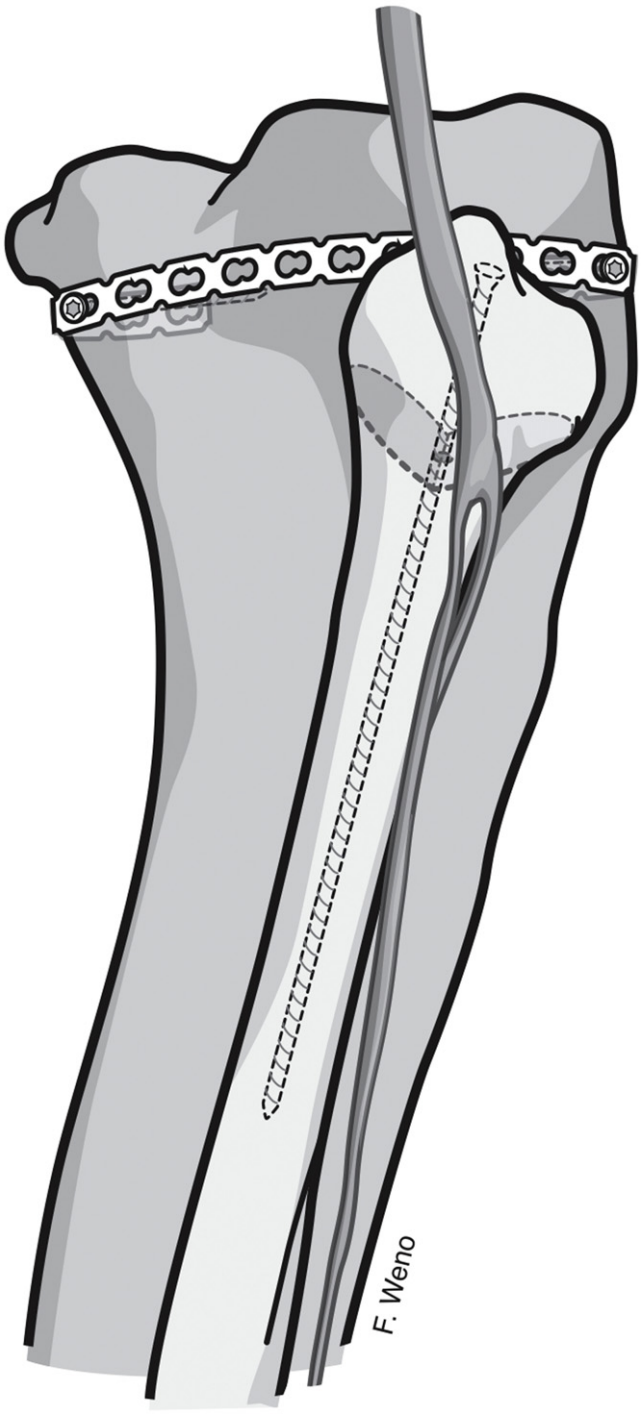

Fig. 1. Illustration of the posterolateral corner of the tibial plateau showing the horizontal rafting plate. Observe the peroneal nerve crossing the fibular neck. Dashed line shows the chevron osteotomy. An extra long screw was used to fix the fibular osteotomy.

Table 1
Age average, gender, injury mechanism, Schatzker and Luo classifications.

Patients	Gender	Age	Injury mechanism	Schatzker Classification	Luo Classification
1	Male	35	Motorcycle accident	II	Posterior + anterolateral columns (Flexion/Valgus)
2	Female	53	Fall	II	Posterior + anterolateral columns (Flexion/Valgus)
3	Female	22	Fall	V	Posterior + anterolateral + anteromedial columns (Flexion/Neutral)
4	Female	49	Fall	II	Posterior + anterolateral columns (Flexion/Valgus)
5	Male	24	Motorcycle accident	V	Posterior + anterolateral + anteromedial columns (Flexion/Neutral)
6	Male	19	Fall	II	Posterior column (Flexion/Valgus)
7	Male	42	Fall	II	Posterior column (Flexion/Valgus)
8	Male	55	Fall	V	Posterior + anterolateral + anteromedial columns (Flexion/Neutral)
9	Male	45	Fall	I	Posterior column (Flexion/Valgus)